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STUDIES ON EFFECT OF CHEMICAL AND SENSORY ASPECT OF PAPAYA *LASSI*

GAVHANE M. S[1], DESALE. R. J[2] & GHULE B. K[3]

[1,3]Research Scholar, Department of Animal Husbandry and Dairy Science, PGI, MPKV, Rahuri, Maharashtra, India

[2]Assistant Professor, Department of Animal Husbandry and Dairy Science, PGI, MPKV, Rahuri, Maharashtra, India

ABSTRACT

Present investigation was carried out to assess the chemical composition, sensory evaluation, of papaya lassi. Lassi was prepared from cow milk with different level of sugar (6, 8, 10 per cent) and different levels i.e. 0%, 12%, 14% and 16% of papaya pulp. The product prepared using 8% sugars and 14% papaya pulp (S2P2) i.e T_5 was found most acceptable on the basis of overall acceptability. It was observed that the overall acceptability score of treatment T_0, T_1, T_2, T_3, T_4, T_5, T_6, T_7, T_8, and T_9 was 7.29, 7.07, 7.54, 7.71, 7.31, 7.85, 7.75, 7.28, 7.77, and 7.66 respectively. It can be concluded that the lassi with papaya pulp can be very well utilized for preparation of nutritious, palatable and low cost lassi by blending 8% sugar and 14% percent papaya pulp.

KEYWORDS: Chemical Composition, *Lassi*, Sensory Evaluation

INTRODUCTION

On the top of the milk products list is the Indian specialty which neverfails to please –"*lassi*". *Lassi* having consistency of milk and taste of curd is the popular indigenous fermented milk product prepared by mixing *dahi* and water along with sugar. It is served on a large scale in roadside cafes, cold drink shops, bars, restaurants and hotels in almost all parts of India and outside India (Egypt and Pakistan).

India's milk output during the year 2008 – 09 reached the level of 104.8 million tonnes, providing per capita availability of 248 g per day. About 50 percent of this milk is converted into variety of indigenous products like dahi, shrikhand, chhana, paneer, makkhan, ghee, khoa and khoa based sweets, etc.Out of this, nearly 7 per cent milk is converted into dahi which is the base for preparation of fermented milk products (Bhasin, 2009).

Lassi, one of the fermented milk products is ideal for serving with hot dishes as it helps the body to digest the spicy food. Addition of a little turmeric powder to it is believed to be a folk remedy for gastroenteritis. Lassi is not only perfect as a morning smoothie, but it is also relished as a hot – weather refreshment to beat the scorching heat and it acts as an energizing liquid mealor it provides relief after eating a delicious but hot spicy meal. Thus, lassi is a digestive aid for the afternoon meal; it settles the upset stomach and it is the perfect cooling agent (Anonymous, 2006).

There are many new products flooding the market but the benefits of lassi cannot be replaced by any other drink. Therefore, it is appropriately said that lassi is a natural stress – buster. Being therapeutically valuable and delicious in taste; it is very popular among all age groups.

MATERIALS AND METHODS

The research work on "Studies on effect of fruit additives on microbial status of lassiwith special reference to lactic acid bacteria" was conducted in laboratory of Department of Animal Science and Dairy Science, Post Graduate

Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri.

Experiment Details

- Total No. of factors – 2
    - Sugar
    - Papaya pulp
- Levels of factors
    - Levels of sugar – 3
    - Levels of papaya pulp – 3
- Total No. of treatment combinations – 9
- Total No. of replications – 4

Treatment Combinations

T0: - S2P0 (8 % sugar + 0% papaya pulp)

T1: - S1P1 (6 % sugar + 12 % papaya pulp)

T2: - S1P2 (6 % sugar + 14 % papaya pulp)

T3: - S1P3 (6 % sugar + 16 % papaya pulp)

T4: - S2P1 (8 % sugar + 12 % papaya pulp)

T5: - S2P2 (8 % sugar + 14 % papaya pulp)

T6: - S2P3 (8 % sugar + 16 % papaya pulp)

T7: - S3P1 (10 % sugar + 12 % papaya pulp)

T8: - S3P2 (10 % sugar + 14 % papaya pulp)

T9: - S3P3 (10 % sugar + 16 % papaya pulp)

Where, T – Treatment, S – Sugar, P – Papaya pulp

Sensory Evaluation

Lassi samples prepared under this study were organoleptically evaluated by the panel of six semi – trained judges adopting 9 point Hedonic scale. A score card given by Dharam Pal and Gupta (1985) with slight modification (Ashwani, 1992) was used for sensory evaluation of lassi.

Chemical Analysis

The samples of finished product from various treatment combinations were chemically analyzed for fat (ISI: 1224, Part I, 1977), Protein by Micro Kjeldhl's method as per Menifee and Overman (1940), the protein content was obtained by multiplying per cent nitrogen of sample by factor of 6.38. Lactose (reducing sugar) Lane and Eynon's (1923)

method given in IS: 1479 (Part II) 1961.Total sugars by the volumetric (lane-Eynon) method as a described in ISI (1977) and ash IS: 1479 (Part –II) 1961, total solid (IS: 1479 part II 1961.

The results obtained were analyzed statistically by using completely randomized design (CRD) as per Panse & Sukhatme (1985).

RESULTS AND DISCUSSIONs

Chemical Composition

Though the mean value of fat content in *lassi* samples in this case showed variation but it was statistically non significant. Control (T_0) and T_8 *lassi* samples recorded highest fat content (3.27 ± 0.119 per cent). The sensorily superior *lassi* sample (T_5) contained 3.10 ± 0.119 per cent fat. Consuming *lassi* containing less /minimum fat is an additional benefit of papaya *lassi* sample such as T_5 for the health conscious consumers.

In case of protein content of *lassi*, statistically significant variation was noticed due to sugar and papaya pulp in isolation. But the effect due tointeraction was non significant.The protein content in papaya *lassi* under different treatments ranged from 3.66 to 3.87 ± 0.044 per cent. Meager increase in the protein content was noticed with increase in papaya pulp. Sensorily superior treatment T_5 contained 3.84 ± 0.044 per cent protein.

Added papaya pulp did not affect the lactose content of the end product considerably. However, significantly higher values for lactose were recorded for papaya treated *lassi* samples T_2, T_3, T_4 and T_5. The maximum lactose content as recorded for T_2 and T_5 was 3.78 ± 0.026 per cent.

The total sugar content of different treatments of *lassi* was in the range of 18.50 (T_1) to 22.11 ± 0.443 (T_9). Sensorily superior treatment (T_5) contained 19.99 ± 0.443 per cent total sugar and was at par with T_1, T_2, T_3 and T_4.

Combination of levels of sugar and papaya pulp had significant effect on ash content of *lassi*. The values of ash content were recorded between 0.92 (T_4) to 1.05 ± 0.011 (T_9). Thus, papaya *lassi* under different treatments was nutritionally rich with higher ash content.

As the levels of sugar and papaya pulp increased, the amount of total solids in *lassi* was also increased. Minimum total solids were recorded in sample T_1 (21.97 ± 0.690); while it was maximum in T_9 (31.14 ±0.690). It was 29.08 ± 0.690 per cent in sensorily superior treatment T_5. It may be concluded that *lassi* having 8 per cent sugar and 14 per papaya pulp and 30 per cent total solids is more acceptable for the consumers.

The Volatile Fatty Acids (VFA) content has relationship with flavor of the milk products. The sensorily superior sample T5 recorded highest content of VFA (2.50 ± 0.062 ml); whereas for all the other treatments this amount ranged in between 2.40 to 2.50 ± 0.062 ml. it may be stated that as the sample T_5 recorded good amount of VFA, it ranked at top after organoleptic evaluation; particularly for flavour attribute.

The control (T_0) sample of *lassi* recorded highest acidity (1.05 ± 0.004% LA) while it was significantly less with treatment samples (papaya). All the *lassi* samples had moderate acidity and hence acceptable. The sensorily superior papaya *lassi* samples (T_5) had 0.94 ± 0.594 % LA acidity. This may be the reason that sample T_5 ranked at the top sensorily.The individual and interaction effect of sugar and papaya pulp was non significant in case of pH of *lassi*. The pH was in between 4.12 to 4.29 ± 0.119.

Sensory Properties

Levels of papaya pulp had significant effect on colour and appearance. Papaya pulp at 14 per cent was found significantly superior over 12 per cent but was at par with 16 per cent level. This attribute was not affected due to levels of sugar. The combined effect of sugar and papaya pulp was found significant. Treatment T_5 (8 per cent sugar and 14 per cent papaya pulp) was statistically superior over others (score 8.00 ± 0.102). In comparison with control (T_0), the results are statistically significant. The mean value of T_0 (7.53 ± 0.05) is at par with T_4 (score 7.40 ± 0.05) and T_3 (score 7.63 ± 0.05). This indicates that addition of papaya pulp is beneficial in lassi.

The effect of levels of sugar, papaya pulp and the interaction thereof had significantly influenced the body and texture of lassi. Maximum sensory score (8.06 ± 0.122) was recorded by treatment T_6 (8 per cent sugar and 16 per cent papaya pulp). However, the score obtained by sample T_5 was 7.93 ± 0.122 and was very closer to T_6 and they were at par. Sample T_5 and T_6 were graded as "liked very much". It can be stated that incorporation of papaya pulp as fruit additive is beneficial to improve body and texture of lassi.

The levels of sugar and papaya pulp individually and in combination had significant effect on flavour of lassi. Treatment T_5 secured highest sensory scores (7.87 ± 0.162). If compared with control (T_0), except T_1, T_4 and T_7; all other treatments were superior over T_0. Therefore, it can be stated that addition of papaya pulp is beneficial for flavour development in lassi.

Similar to above, individual and combined effect of sugar and papaya pulp was significant on acidity as sensory attribute of lassi. Most of the samples (except T_1) scored in between 7 and 8 and graded nearer to "liked very much".

CONCLUSIONS

- Papaya lassi prepared from cow whole milk dahi, with addition of 10 per cent water, 8 per cent sugar and 14 percent papaya pulp proved to be most accepted sensorily amongst the various treatment combinations studied.

Considering all the sensory attributes together, the lassi samples of treatment T_5 proved to be most acceptable as they scored highest for the most important sensory attribute i.e. flavour which is allotted 45 marks out of total 100 on the basis of 100 point scale. The samples of treatment T_5 also ranked first for colour and appearance; besides they scored near about the samples which ranked first in case of flavor and acidity.

- Papaya lassi prepared as above (1) containing 3.10 ± 0.119 per cent fat, 3.84 ± 0.044 per cent protein, 3.78 ± 0.026 per cent lactose, 19.99 ± 0.443 per cent total sugar, 0.98 ± 0.019 per cent ash, 29.08 ± 0.690 per cent total solids, 2.50 ± 0.062 ml VFA, 0.94 ± 0.059 per cent lactic acidity and 4.28 ± 0.119 pH was nutritionally rich.

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APPENDICES

Table 1: Mean Chemical Composition of *lassi* (Control and Papaya)

Treatment	Chemical Constituent (%)								
	Fat (%)	Protein (%)	Lactose (%)	Total Sugar (%)	Total Solid (%)	Ash (%)	Acidity (%)	Ph	VFA (Ml)
T_0	3.27	3.54	3.74	13.67	21.49	0.82	1.05	4.21	2.4
T_1	3.23	3.66	3.71	18.5	26.17	0.96	1.04	4.12	2.23
T_2	3.23	3.69	3.78	18.84	28.06	0.98	0.99	4.25	2.27
T_3	3.23	3.69	3.77	20.15	29.69	1.04	0.95	4.15	2.2
T_4	3.2	3.78	3.77	19.99	28.7	0.92	1.01	4.19	2.47

T_5	3.1	3.84	3.78	19.99	29.08	0.98	0.94	4.28	2.5
T_6	3.17	3.87	3.75	21.2	30.71	1.04	0.93	4.28	2.33
T_7	3.23	3.72	3.76	20.97	29.47	0.98	0.83	4.23	2.43
T_8	3.27	3.81	3.75	21.43	30.25	1.02	0.8	4.14	2.4
T_9	3.2	3.81	3.75	22.11	31.14	1.05	0.77	4.27	2.47

Table 2: Overall Acceotability of *lassi* with Papaya Pulp (Control and Papaya)

Treatment	Sensory Attributes				
	Colour and Appearance	Body and Texture	Flavour	Acidity	Overall Acceptibility
T_0	7.53	7.17	7.27	7.20	7.29
T_1	7.33	7.37	6.80	6.80	7.07
T_2	7.67	7.73	7.37	7.40	7.54
T_3	7.60	8.02	7.60	7.63	7.71
T_4	7.40	7.47	7.13	7.27	7.31
T_5	8.00	7.93	7.87	7.60	7.85
T_6	7.73	8.07	7.60	7.60	7.75
T_7	7.27	7.63	6.93	7.23	7.26
T_8	7.73	7.97	7.70	7.70	7.77
T_9	7.87	7.97	7.30	7.50	7.66